THE
VETERINARY JOURNAL

Editor :
FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ROYAL ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor :
GLADSTONE MAYALL, M.R.C.V.S.

SEPTEMBER, 1919.

Editorials.

THE FUTURE OF THE VETERINARY SERGEANT.

Now that the army has been demobilised, the Royal Army Veterinary Corps has, in line with all other branches of the Service, returned its personnel to civilian life, and it has become a question of discussion on several occasions as to whether the veterinary sergeant will become in any way a " thorn in the flesh " to the qualified practitioner.

No fear in this direction need be held in the slightest degree, for the training of the veterinary sergeant cannot possibly, except in a very few exceptional instances, have done anything else but inspire him with a wholesome respect for the knowledge of the trained veterinary officer; and to ape this would be the last thing that he would think of. To begin with, his routine of duty is totally different to that of civil life and his class of cases is very much narrowed, whilst the amount which he is permitted to do in the army is exceedingly elementary. Beyond stitching up and dressing a few wounds, treating colic, diagnosing a few skin and urgent cases, and setting them aside for the inspection of the veterinary officer, his duties are confined to the military side of a soldier's life, and it is questionable whether he would ever prove a real opponent even to the gelder or the quack. To them he might at first appear a bogie, as his qualifications to practice are on a similar plane, *i.e.*, they only exist in the ability or craftiness of the individual man; but the average farmer or horse owner would not be long in finding out his true worth, and the fact of his being able to put " late Sergeant R.A.V.C." after his name would be no help in calving a cow or any other type of difficult case without the practical knowledge, and that could not be acquired by the brief army training to which the soldier had been subjected.

As handy men to help a qualified man in their legitimate sphere they will be excellent, but " on their own " they will never make a " do " of it, and the qualified practitioner certainly never need

have the slightest fear of these men as being likely to affect his sources of income in the slightest degree.

Thousands of A.V.C. men are already demobilised, but most of them have returned to their legitimate civil occupations, thankful to do so, many openly expressing the wish that they never see a sick horse again.

With many of them it was the sergeant's stripes, the extra pay, and the comforts of the sergeants' mess that were the attractions to work for the examination which created them "veterinary sergeants," and not in more than ten per cent. the special wish to treat sick animals. In fact, the statistics will show, if referred to, that most of them never had the slightest association with the horse or mule other than in the capacity of 'bus driver or carman prior to joining the army; and it would be absurd to suppose that during the few years' stress of war in which they served in the army, they could acquire anything more than a very elementary knowledge either of the comprehensive management or veterinary treatment of the animals with which they often unwillingly spent only some eight hours of their working days.

Practically all have returned to their old civilian jobs, and although, in a few instances, a man may try to make a living on the fact that he has been a veterinary sergeant or a sergeant in the Royal Army Veterinary Corps (two totally different meanings), we of the profession need never have the slightest fear that they will ever attempt to become either registered or qualified opponents.

ARMY HORSE SALES AND CONTAGIOUS DISEASES.

In another column, at the request of the War Office Authorities, we publish an article by the Director of the Publicity Department on the condition of Army horses sent for public auction, in reference to their liability to infection by contagious diseases, particularly glanders and mange.

The article was written with the idea of refuting certain statements which had found their way into the public press, saying that the Military Authorities had sold animals affected with contagious diseases.

It draws attention to the fact that no horse is sold without previous inspection by a veterinary officer and all are submitted to the Mallein test.

Out of 105,000 animals sold during the last six months, no suspicion of glanders has occurred, and only 32 cases of mange were reported. These proved, upon investigation, to be cases which had been out of the Army for a period of three months or more, and had passed, during that time, through several hands, so the infection might have been caught after the sale.

Considering the large number of horses which have, of necessity, been brought together for the purposes of war, it is wonderful that

mange or glanders did not cause more devastation, and the results which have been obtained speak volumes for the good work done by the officers and men of the Royal Army Veterinary Corps.

Without horses and mules the war could not have been won, and without the knowledge and organisation of the Veterinary Department the horses and mules could not possibly have been kept going. The R.A.V.C. contributed its fair share to the victories gained, and now that the time of peace has arrived it is doing its best from the salvage point of view to lessen the expenses of the taxpayer by guaranteeing and promoting the health and good condition of the animals to be sold.

Original Communications.

PAINLESS STANDING POSTURE CASTRATION.

By R. HUDSON, M.R.C.V.S.,
Retford.

A TWO-YEAR old colt* had been selected, and he was placed in the usual standing operation position on the side of a wall ensuring a good light.

The twitch having been applied, the scrotum was examined, found normal, and wiped with the end of a towel wrung out in a solution of Izal.

* The subject referred to was one of two selected for a demonstration before the members of the North Yorkshire and North Midland Veterinary Associations, and showed no indication of pain throughout the whole procedure.—Ed. VET. JOURN.

Using a 10 c.c. hypodermic syringe, with an ordinary needle, 6 c.c. of a $7\frac{1}{2}$ per cent. sol. cocaine were taken up, halved by the stop on the piston rod, and injected into each testicle. The needle, steadied by the point of the finger, penetrated the testicle at the side and about half way up, so that the point reached the centre of the epididymus, and part of the injection was given. The needle was then withdrawn about an inch, pressed in a forward direction, again withdrawn, and pressed to the rear of the testicle, injection taking place at each point. The needle was now withdrawn, and the same procedure carried out on the other testicle, and the area injected gently massaged between the thumb and fingers for about a minute.

Three or four minutes were allowed to elapse, which were taken up by preparing instruments and washing hands.

Having placed clams, scissors and knife in a pail of antiseptic solution, the knife was removed, the off-side testicle gripped firmly, and an incision made in the scrotum about the length of the testicle, the near-side testicle following in the same manner.

Steel clams of a special pattern were now applied to the near side testicle, well up on the cord, and the testicle removed with a pair of scissors about $\frac{3}{4}$ to 1 in. from the clam blade, care being taken not to stretch the cord too much, or the portion left may be too short to obtain a good sear.

With the iron a point below red heat, the end of the cord was seared lightly, vascular and non-vascular, the latter not being neglected, because any oozing of blood into the scrotum is against good results.

The end of the spermatic artery was plainly visible, and was watched to see that it became occlued, and, when thought safe, the clam was gently opened and closed three times as a test of safety. As no escape of blood occurred the clam was removed and placed on the other cord.

Having removed both testicles, the wounds were washed out with the solution in the pail, examined to see that they were of good size for drainage, and enlarged if necessary.

A little antiseptic ointment is inserted well up to the ends of the cord and worked about the inside of the scrotum with the fingers.

THE CONDITION OF ARMY HORSES.

By the Director of the Publicity Department, War Office, London.

Statements have occasionally been reported in the Press during the past few months alleging that the Military Authorities have sold horses affected with contagious diseases. These statements, though no doubt made in good faith, will not bear investigation, and the War

Office has no hesitation in assuring the public that the Military Authorities concerned take, and have always taken, such scrupulous care in the treatment of horses affected with contagious diseases that more reliance can be placed on an Army animal than on one not bought direct from the Army.

Generally speaking, it is under the heads of mange and glanders that charges are made against the Military Authorities of selling diseased animals, these being the two diseases of horses best known to the public. But the most unremitting watch is kept over Army horses to ensure the detection in its earliest stage of any disease, and especially of any contagious disease.

At or about the date of the Armistice the total number of cases of skin disease, either diagnosed as or suspected of being mange, was only three-quarters per cent. of the total annual strength. Of these only one-quarter per cent. were undoubted cases of mange. There was a slight increase in the total number under treatment during the winter months, but the number never reached one per cent. of the strength. From November, 1918, to the present date the percentage has fluctuated but never been higher than .9, and has fallen as low as .5 per cent., or, in other words, one in two hundred.

No animal known by the Military Authorities to be the subject of skin disease is sold, for naturally the last thing the Army wishes to do is to infect "civilian" horses, or, in other words, to vitiate the very market which would provide future Army remounts. Between November, 1918, and April, 1919, there were 4466 cases of mange among "civilian" horses. Of this number only 32 were alleged to be due to infection in the Army, but the fullest investigation has proved that in practically every case a long period, varying from about three months upwards, had elapsed between sale and infection, while in some cases the animal had even passed through several hands before being reported to be suffering from mange.

During the period under review no fewer than 105,000 Army horses were sold in the United Kingdom, and the fact that out of this large number only 32 subsequently gave rise to suspicion—and, as shown above, none of these 32 cases will stand investigation—is some evidence of the meticulous care taken by the Army Authorities and of the thoroughness of a system of treatment which can produce such good results.

Regarding glanders, during the six months under notice there were twenty-one outbreaks in "civilian" life, not one of which was reported to be due to Army infection. Every one of the 105,000 animals sold was before sale twice tested for the existence of this disease, and the thoroughness with which the test was conducted is reflected in the result above indicated.

Epizootic Lymphangitis—a disease not so well known to the British public, but which is dreaded by all who have had any practical experience of it after its introduction by surplus Army horses sold at the termination of the South African war—has been unknown.

Statement showing the number of cases of parasitic mange reported in civilian animals for the six months from 1st November, 1918, to 30th April, 1919, in the areas included in the various commands of the United Kingdom. Also the number of cases in which it is alleged that the infection came from Army animals. :—

Commands.	Cases Reported	No. of Cases Alleged to be due to Army Animals.	Remarks.
Scottish ..	475	Nil.	
Northern ..	1161	2	In both cases over three months had elapsed between the sales and the outbreak.
Western ..	789	3	These three cases occurred nine months, four months, and three months respectively after sales.
Eastern ..	1399	18	In all cases the period between sale and outbreak was considerable.
Southern ..	596	9	All these were investigated and long periods had elapsed between the sale and the outbreak.
Aldershot ..	46	Nil.	
	4466	32	

During the period from 1st November, 1918, to 31st July, 1919, over 105,000 Army animals were disposed of at auction.

Clinical Cases.

CHLORAL HYDRATE, ITS USE AND ABUSE IN THE ARMY.

By CAPT. W. WATERS,
Blofield, near Norwich.

Now that war is over I desire with the consent of the administrative heads of the R.A.V.C. to criticise the way in which this drug is used in the Army.

Every unit in the field is supplied with a 20 lb. veterinary chest containing many useful drugs and accessories for the treatment of animals in the absence of the V.O.

The drugs suitable for colic are ammon. carb. balls and chloral hyd. If the former was used more often or combined with the latter I am convinced that less harm and more beneficial results would accrue to the patient. As it is, as soon as a horse shows signs of colic he is given oz. ss. of chloral, which is often repeated at intervals of an hour or two all through the night until the V.O's inspection next day, without the assistance of any purgative or stimulant. This treatment is comparable to a man with a broken leg being given an anæsthetic so that he does not feel the pain, whilst taking no steps to place the fracture in splints.

I have often seen a horse affected with impaction so treated for ten hours or more, the only result being a badly blistered mouth as a sequel to chewing one or more balls. Occasionally, also, one gets alarming symptoms develop when the drug is administered to a horse with an empty stomach, due, I presume, to blistering of the mucous membrane.

In these cases, after the toxic effect has worn off, the patient becomes very violent and tries its hardest to vomit, which symptoms often last from 12 to 24 hours, and even after that one has difficulty in getting the animal to feed.

Personally, I have strong views regarding the use of a sedative in colic at all, as I think pain, in causing an animal to roll about, is a great adjunct to medicines such as purgatives. Anyhow, I think it is a suicidal policy to allow its use alone, and think it should be administered much more rarely. Finally, were it possible to ascertain the quantity of this expensive drug supplied to the army during the last five years I think the figures would be very astounding.

FOOT ROT IN SHEEP.

By G. A. KNAPP.
Millbrook, N. Y.

Two large flocks of sheep suffering from this disease came under my observation at about the same time. In each instance the disease

had spread to such an extent that almost the entire flock was affected.

My first procedure in all cases was to trim the feet well cutting away all the loose and diseased horn. Following this I used several treatments which proved to be unsatisfactory, until, finally, I tried the following formula, which gave most gratifying results:—

Acidi sulphurici	℥ ij
Olei Terebenthinæ	℥ ij
Petrolati	℥ xx

M. Ft. Ung.

The mixture should be compounded in an earthen container, mixing the petrolatum and turpentine together well. Then stir in the sulphuric acid slowly. After cooling, the mixture is ready for use.

Sig.—Apply once a day, and in severe cases cover the lesions with cotton bandage. *Cornell Veterinarian.*

QUARTER ILL IN HEIFER.

By G. GAIR, M.R.C.V.S.,
Conon Bridge.

Recently I was asked to see a heifer, pregnant six months, which became seriously ill about mid-day. I saw the animal about 7 p.m., which by this time was prostrate, temperature 104°, with swellings on the left side, extending from over the shoulder to the sacrum, which rapidly increased in size during an hour or two previous to my visit.

In passing the hand over the swellings the characteristic sound accompanying a case of Quarter Ill could easily be detected. The several swellings were becoming confluent, and those of earlier formation could be cut into without the animal flinching.

Realising that it was an acute case of Quarter Ill, I at once decided to make a number of incisions through the skin covering the affected part at intervals of four to six inches apart, and inject a solution of carbolic acid in warm water. This I did with a bent glass syringe, turning it so that as large an area as possible could be effused with the one incision, with the result that the solution came in contact with that injected into the previous wound. The swellings were slightly rubbed to help the spreading of the fluid. Carbolic acid was also given internally.

Within a few hours after commencing treatment a marked change came over the patient. The profound depression gradually disappeared,

until the heifer ultimately got on her feet and partook of a gruel drink. The subsequent recovery was continuous.

The muscular tissue in the entire area affected became in the course of a few days completely decomposed. To remove it necessitated the skin which was unaffected being incised, when the underlying dead material was actually removed in handfuls, thus exposing the external surfaces of the scapula and ribs. The smell of the discharge from the wounds was very fœtid and continued so for about two weeks.

The wounds were dressed daily with a weak solution of carbolic acid, dusted with iodoform co., and then covered with boric lint.

By the end of two months the recovery was almost complete, although there remained a well marked hollow on the affected side corresponding to the removed tissue.

The heifer throve and calved in due course.

General Articles.

PROGRESS IN VETERINARY WORK IN INDIA.

It is proposed to review the work done by the various Provincial Veterinary Departments and the Imperial Bacteriological Laboratory at Muktesar under the following heads :—

1. Administrative changes and health of stock.
2. Preventive inoculation and legislation.
3. Cattle-breeding.
4. Sheep-breeding.
5. Veterinary education.
6. Veterinary research.

The department is much understaffed and considerable expansion is necessary if prophylactic measures for the cattle, which are the backbone of the Indian cultivator's prosperity, are to be provided on an adequate scale. Much educative work requires to be done in the districts by the veterinary staff before people will begin to understand the ways in which contagious diseases can be avoided and kept under control. This can only be achieved if more staff is provided.

Administrative Changes and Health of Stock.

Bombay.—Colonel G. K. Walker, C.I.E., held charge of the department throughout the year. Out of the subordinate staff of 89 men 5 were on military duty and 8 posts were unfilled.

INSTITUTE

As regards contagious diseases the total mortality recorded this year was only 21,137 against 25,801 last year. Among equines there were 230 deaths from surra but, as equine diseases are very rarely reported by the revenue officials, these figures cannot be regarded as a complete indication of their prevalence. Among bovines rinderpest claimed 13,944 victims against 18,502 last year. Hæmorrhagic septicæmia was widely prevalent affecting all the districts; 5,323 deaths were reported against 2,229 in the previous year. More dispensaries are urgently required, but owing to want of funds many District Local Boards are reluctant to undertake their share in the maintenance of these institutions. One case of Johne's disease was detected in a buffalo belonging to the Agricultural Department's dairy farm at Poona. This is the first time the disease has been discovered in the Presidency, but it is probably much more prevalent than hitherto realised, and it will be made the subject of further investigation. Colonel Walker states that the work is developing in every direction and the need of more superior staff is becoming an urgent matter. Proposals have been submitted for an increase and for a simultaneous scheme of decentralisation, the necessity of which has been previously pointed out.

Madras.—Mr. Aitchison, Principal of the Madras Veterinary College, held charge of the office of Superintendent in addition to his own duties from the 1st April, 1917, to 12th November, 1917, when Mr. F.W. Ware, the permanent Superintendent, again took over charge. The post of Second Superintendent sanctioned by the Secretary of State could not be filled on account of the war. Since the close of the year proposals for increasing the number of Deputy Superintendents to four have been sanctioned by Government. There was a net addition of 10 in the subordinate staff. Two more Inspectors' ranges have since been sanctioned. With a view to accelerate the rate of establishment of veterinary institutions, the Government of Madras have instructed the Superintendent to submit annually a list of six places where such institutions can be opened in the next but one succeeding financial year. It is hoped that at least six will be opened every year regularly in future. There is a steady increase in the mortality of cattle from disease, as will be seen from the following figures :—

Year.	Total.
1913–14	50,728
1916–17	68,588
1917–18	70,018

The increase is due chiefly to rinderpest. This disease has been found to follow the movements of cattle from the States of Mysore and Hyderabad. The Government have therefore arranged, as a preventive measure, for the posting of additional Assistants along the frontier taluks. The provision of hospitals and dispensaries in the frontier taluks also forms a special feature of the rinderpest campaign and Collectors of districts have been instructed to close cattle fairs and markets during the prevalence of this disease in their districts. In view of the importance of minimising the ravages of rinderpest it is hoped that all district officers will co-operate in impressing upon the public the necessity of taking full advantage of the advice and assistance of the trained staff which is now available in every district. Mr. Shilston, Second Bacteriologist at Muktesar, who visited the Presidency in connection with the question whether it is feasible and desirable to modify the inoculation system now in force in the Presidency, has recommended the adoption of the simultaneous method of inoculation where conditions are suitable, *viz.*, at Government, municipal and local fund institutions and in the case of cattle belonging to enlightened private owners. If the results are favourable it would be an object lesson to the ryots.

Glanders, from which this Presidency had hitherto been free, made its appearance during the year and a special officer has been appointed to investigate the disease in the city of Madras.

Bengal.—Lieutenant-Colonel A. Smith remained in charge of the department in addition to his duties as Principal of the Bengal Veterinary College. The total number of Assistants doing military work during the year was eight. There was an unusual increase in the mortality of animals from contagious diseases, the total number of deaths reported being 26,486 as against 8,415 in the preceding year. This is largely due to the fact that in the most seriously affected districts reports of outbreaks of cattle diseases in the interior were received late, and as, unfortunately, no precautionary measures were taken by the villagers, the contagion spread, with the result that a very large number of animals died before inoculation work could be undertaken. Rinderpest alone was responsible for 21,126 deaths as against 5,443 in the previous year. Hæmorrhagic septicæmia and anthrax came next in order, being responsible for 2,407 and 1,683 deaths respectively. Leaflets in Bengali, dealing with the prevention and treatment of contagious diseases, were freely distributed to the villagers, and the benefits accruing from isolation, disinfection and burial of carcases were fully explained to them.

Bihar and Orissa.—The department was under the charge of Mr.

D. Quinlan throughout the year. Of the subordinate staff three were on military duty. It is reported that as the conditions of pay are not satisfactory candidates for the service have been few and ill-qualified. The Local Government have submitted proposals to the Government of India for a great increase in the supervising staff and more attractive conditions of service for all branches of the department. There has been some improvement in the reporting of the outbreaks of epidemic diseases except in one division. In addition to inter-district reporting, arrangements are being made with neighbouring Provincial Governments and States for communicating news of border outbreaks. The total number of deaths in the province was 21,754 as compared with 26,107 in the preceding year. Of these, 14,390 deaths were due to rinderpest. As mentioned in last year's report, the Ranchi inoculation scheme, which consists in inoculating cattle through the agency of a special staff of locally trained inoculators, was continued in a modified form with a smaller staff (14 against 23) working over a limited area, and recommendations have been made for continuance of the scheme for another five years or until such time as a sufficient number of Assistants are available to take over this work. The supply of sera and vaccines has now been made a charge on the funds of District Boards, and it may reasonably be expected that members of these boards will take a more active interest in the work in view of the charge which it now imposes on their funds.

United Provinces.—Mr. E. W. Oliver returned from leave in September, 1917, and took over charge from Mr. S. G. M. Hickey, Second Superintendent, who was officiating for him. Twelve members of the subordinate veterinary establishment were on military duty during the year under review. The total reported mortality from contagious diseases was 17,407. This year surra was much more widespread. Blackquarter and anthrax were responsible for 3,114 and 1,687 deaths respectively. Hæmorrhagic septicæmia appeared in a specially virulent form and carried off 3,142 animals, and had it not been for the effective prophylactic measures taken by the department very much more serious losses would have occurred. Foot-and-mouth disease levied a toll of 2,854 deaths. In view of the increasing shortage of horses in India brought about by the demand made on the existing supply to meet the needs of the Army, the Civil Veterinary Department has addressed District Boards and other public bodies pointing out the improbability of any improvement in the situation for some years to come, and urging upon them the importance of lending every encouragement and help in the matter of horse-breeding by locating Government sires wherever possible and advising owners to retain and reserve their best mares for breeding purposes.

A vernacular veterinary journal is issued monthly by the Society formed by the subordinate staff of the department.

Punjab.—Colonel Farmer, C.I.E., held the post of Chief Superintendent throughout the year. Two Inspectors and 37 Assistants were working in the Military Department. The year was, like that which preceded it, remarkable for the excess of the monsoon rains and the consequent high mortality among cattle. The number of reported deaths from contagious diseases was 30,085 or slightly less than in the preceding year, but Colonel Farmer is of opinion that a large number of deaths from surra have not been reported. Even so, among equines no less than 1,362 deaths from surra against 128 in 1916 were reported. The year was very favourable to its propagation, and the extensive movements of animals partly accounted for its appearance in some places where it had scarcely been known before. With a view to reducing the mortality, owners have been advised to keep their horses in dark stables during the day when biting flies are active. Conferences were also convened to consider measures for prevention of this disease as well as to ensure that its presence is promptly brought to notice. Ten cases of dourine were detected during the year. In view of the widespread extent of this highly dangerous disease, the Dourine Act has been extended to the whole province and the Lieutenant-Governor has recently recommended the amendment of the Act so as to confer more drastic powers on veterinary practitioners and Inspectors. In the opinion of Colonel Farmer, the time has come for the registration of all privately owned stallions so as to control horse-breeding. But even if adequate steps could be adopted for their control, the effect of the measure would be far from complete owing to the unusual practice of leaving horses, which are not kept for stud purposes, uncastrated. Among bovines hæmorrhagic septicæmia and blackquarter accounted for 13,445 and 2,609 deaths respectively. Rinderpest claimed 8,495 victims which is half the number recorded last year.

That the Veterinary Department in the Punjab is growing in popularity is evident from the fact that whereas in the quinquennium 1900–05 only 30,000 animals were treated in the hospitals, the number rose to an average of 146,000 in the quinquennium ending in 1910, while in the year under report the number of animals treated was 360,000. A further sure sign of the steady growth of appreciation shown by stock owners is the fact that the people themselves are beginning to build veterinary hospitals, and cattle insurance is also coming into favour. The department is steadily working for the improvement of cattle-breeding and there are now 1,087 stud bulls at work in the province, an increase of nearly 10 per cent. on the figures for last year.

The Punjab Veterinary Association continues to flourish. Its Journal has been considerably improved and is a very valuable contribution to the vernacular veterinary literature of the country.

Burma.—Colonel G. H. Evans was in charge of the department throughout the year with Mr. Rennie as Second Superintendent. Rinderpest was confined to two districts of Lower Burma, viz., Amherst and Insein. In the former district it is reported that the disease is brought in from Siam. The outbreak in the latter district is said to have originated in the vicinity of Rangoon, whence it gradually spread, chiefly through the medium of the numerous herds of Indian owned milch and other cattle whose owners are the least educated as regards scientific methods of prevention and control of contagious disease. With the exception of the Bhamo District where over a thousand deaths from rinderpest were reported, Upper Burma may be said to have enjoyed during the year practical immunity from contagious cattle disease. In the Shan States, generally speaking, the health of stock was unusually good, though occasional outbreaks of rinderpest in some parts is recorded.

As regards preventive inoculation and the so-called readiness of the Burman cultivator to have his cattle inoculated, Colonel Evans makes the following remarks: "There may be an impression that cattle-owners in general jump at the opportunity of free serum injection for their cattle; if this is so, it is a fallacy. Very few are really desirous to have it done. Much tact, patience, chaff, etc., is often necessary to induce Burmans to grant consent. With them in my opinion the chief obstacle is laziness; they hate bringing their cattle, waiting their turn or giving a hand. If the job can be done while they sit around and smoke they don't mind. With Indians the case is quite different. They do not wish to have anything done, or be interfered with.

"When cattle are injected it is usually hopeless getting owners to mix their cattle with sick ones; they prefer to take their chance of animals contracting disease later. We have injected many animals two or three times owing to fresh cases being introduced, but, generally speaking, one injection is all owners will submit their cattle to."

There was a very marked improvement in the working of the segregation rules in Amherst and the benefits derived therefrom were better understood. As might be expected, in some districts villagers take to them more quickly than others. The report emphasises the necessity, in the direct interest of Burman cattle-owners, of some action in the way of effective control of the badly managed herds.

of cattle kept by Indians in Burma, as all their methods help the spread of infectious disease among cattle.

Central Provinces.—Mr. C. W. Wilson held charge of the department throughout the year. The post of Second Superintendent was vacant. Fourteen Inspectors and Assistants were on military duty. The total mortality from contagious diseases was reported to be 24,380 against 19,894 in the previous year. Of these, rinderpest alone accounted for 13,420 deaths, while hæmorrhagic septicæmia was responsible for 5,270 deaths. An extensive outbreak of surra again occurred throughout the province, entailing a loss of nearly 542 equines.

It is gratifying to note that the department is gaining, more and more, the confidence of the people. In two years the number of cases treated by Veterinary Assistants has risen from 267,676 to 444,104.

Cattle-breeding farms continued to be run by the Agricultural Department working in co-operation with the Veterinary Department. The educational work done by the latter was confined as usual to lectures and demonstrations given at a few of the more important Agricultural Shows and at meetings of Agricultural Associations. It is proposed to prepare a series of bulletins in a popular style on stock-breeding and cattle diseases. The necessity for this form of propaganda cannot be sufficiently emphasised. The Agricultural Department is rapidly increasing the number of cattle farms under its control, and unless there is a corresponding increase in knowledge and desire for progress among the people much of its work will be in vain. The distribution of improved stock, especially of good bulls, will fail to improve the cattle of the country to any appreciable extent unless the people understand the importance of careful breeding and are ready to undertake the steps which will lead to improvement.

Assam.—Mr. W. Harris held charge of the department throughout the year. The subordinate staff was strengthened by the appointment of four new Assistants, bringing the total number to 41. The reported number of deaths from contagious diseases among cattle during the year under report was 60,710 against 47,932 in the previous year. These figures are more than double those of 1913–14, since when the deaths reported have increased year by year. The increase is attributable largely to improved reporting but also to the prevalence of rinderpest in all districts except the Naga Hills. This disease caused 29,808 deaths this year against 20,817 last year. The heaviest mortality was in the district of Goalpara where unfortunately in very few instances were reports of the outbreaks received in time for preventive inoculation to be undertaken. The Local Administration has drawn the special attention of the veterinary and district officers to this

Foot-and-mouth disease, hæmorrhagic septicæmia and anthrax were responsible for 5,603, 5,525 and 2,748 deaths respectively. The increase in the number of deaths due to anthrax is not surprising considering the common procedure in the disposal of carcases. These are frequently left where the animals die, to be devoured by vultures and jackals, with the result that the soil becomes heavily infected. It cannot be too strongly urged that, in all cases of sudden death, the carcass should be buried deeply at once and should on no account be skinned or opened in any way. With a view to give the people some knowledge as to the prevention and control of cattle diseases, the "Manual of Cattle Diseases in India" by Colonel Walker, C.I.E., was translated into Assamese and a limited number of copies were pistributed during the year.

The Superintendent remarks that, when circumstances permit, the question of sending a number of Veterinary Assistants to the College annually for a course of post-graduate training will have to be considered. Most of the Assistants are in isolated posts where they have little or no opportunity to keep their professional knowledge up to date and where they are inclined to forget much which is essential. The Chief Commissioner recognises the desirability of such a course and has called for a definite scheme to give effect to this suggestion.

North-West Frontier Province.—On Mr. Meadows' services being placed at the disposal of the Army Department, Mr. T. F. Quirke held charge of the department in addition to that of North Punjab. One-fourth of the sanctioned scale of the subordinate veterinary staff was on military duty. On account of abnormal rainfall the year was especially unhealthy. The total mortality from all contagious diseases was 2,904 as against 1,827 in the previous year. A serious outbreak of surra occurred during the year, but the disease was prevented from spreading by the destruction of confirmed cases and by the adoption of suitable measures for the disposal of the carcasses. Among cattle diseases rinderpest claimed about treble the number of last year's victims and foot-and-mouth disease was unusually prevalent owing to the wetness of the weather. The Superintendent remarks that much less difficulty is now experienced in dealing with outbreaks effectively as the benefits of inoculation are more generally understood, animals being readily brought forward for inoculation.

Sind, Rajputana and Baluchistan.—Mr. J. A. G. Cattell held the post of Superintendent throughout the year, except for 13 days in March, when he proceeded to Quetta for training in the Army Remount Department, Baluchistan Circle, and Khan Bahadur S. G. Haji, Deputy Superintendent, acted for him.

Sind.—The subordinate staff consisted of 16 Assistants. The total mortality during the year was 5,686 against 3,326 in the previous year. The increase was chiefly due to the wider prevalence of parasitic gastritis among sheep and goats, rinderpest, hæmorrhagic septicæmia, contagious pleuro-pneumonia among goats, and surra.

Baluchistan.—The subordinate staff consisted of four Veterinary Assistants.

The total number of deaths reported was 9,286 against 16,619 in the previous year. Of these 8,775 sheep and goats died of anthrax, scabs and wireworm.

Proposals for the creation of a separate Superintendentship for Baluchistan, and for the expansion of the department, have been submitted to Government.

The following table compares the amounts of the various sera and vaccines manufactured at this laboratory and issued during the year 1917–18 with the average amounts of the preceding five years.

Name of Product.	Doses Prepared.		Doses Issued.	
	1917–18.	Average of previous 5 years.	1917–18.	Average of previous 5 years.
Rinderpest serum ..	2,146,421	1,069,030	2,069,961	1,127,540
Anthrax serum ..	14,175*	21,623	19,727	25,020
Hæmorrhagic Septicæmia serum	216,457	85,287	189,428	84,311
Hæmorrhagic Septicæmia vaccine. ..	117,124	127,890	117,124	127,890
Blackquarter vaccine ..	..*	10,000	17,324	16,700
Mallein	191,747	25,672	193,147	26,323

* Prepared according to demand.

Note.—The apparent discrepancies in the average doses issued and prepared during the previous five years are due to the fact that the opening balances of the first year of the period were unusually large.

Rajputana.—The subordinate establishment consisted of three Assistants as in the previous year. There are only two veterinary hospitals in the province, one at Ajmer and the other at Beawar. Mr. Cattell reports that the Assistants at Ajmer and Beawar are not under sufficient professional supervision, as his duties in Sind and Baluchistan have increased enormously. It is therefore suggested

that the expansion of the department in British Rajputana, and the question of proper supervision, may be taken up at an early date.

Imperial Bacteriological Laboratory.—During the year under review the output of the products of this laboratory was increased to nearly double that of last year.

To meet the increasing demands for anti-rinderpest serum and to maintain rinderpest virus for use in the inoculation of animals at the military dairies, the branch laboratory at Bareilly was opened during the winter months and 404,847 doses were prepared there. During the year the demand for mallein from the Military Department increased enormously, but all indents were complied with.

The total value of the different products calculated on the basis fixed by Government amounted to Rs. 4,15,080 against an expenditure of Rs. 3,36,481.

Besides serving the needs of India, this laboratory undertook to meet the request of (1) the Ministry of Agriculture, Cairo, for a supply every month of 50,000 doses of anti-rinderpest serum up to December, 1918, and (2) of the Veterinary Department of the Soudan, for 200,000 doses of anti-rinderpest serum to be supplied before September, 1918.

During the year one Laboratory Assistant from Bengal, and a Veterinary Assistant from Kashmir, underwent a course of training at this laboratory.

For statistical information regarding the number of veterinary dispensaries and hospitals, inoculations performed in the various provinces, etc., reference should be made to Appendix IV.

A comparison of the figures of mortality among cattle in India from rinderpest alone during the last three years, viz.—

Year.	Deaths.
1915–16	95,159
1916–17	115,548
1917–18	143,861

indicates that the ravages of rinderpest are on the increase and, even allowing for the fact that the improved system of reporting outbreaks now in vogue has resulted in a large increase in the number of deaths notified, it is permissible to enquire how it is that in spite of the increasing number of inoculations performed we are unable to stamp out the disease or minimise its ravages. The greatest difficulty in this direction is the apathy, stubbornness and ignorance of the villagers. They do not sufficiently understand the contagious nature of the disease and the ruinous results which follow from their neglect of ordinary precautions. They have not yet grasped how much isolation and disinfection help to check the disease. Further, the unrestricted

movements of animals from infected areas and absence of compulsory inoculation of all cattle in the affected village and those surrounding it, are the causes most responsible for the spread of the disease. In this connection it would be well to emphasise the fact that rinderpest is a disease which *can* be stamped out and prevented from again occurring in any district, if proper veterinary police methods are employed, the reason being that the virus which causes the disease is propagated almost exclusively in the bodies of ruminants.

There is no such thing as a spontaneous outbreak, because it can always be proved that the disease is at the time prevalent somewhere in the neighbourhood and that it has been brought to the affected village either by animals suffering from the disease or by infected material. Among the principal methods by which cattle can be protected from rinderpest are (1) the serum alone method, (2) serum and simultaneous method, (3) isolation and disinfection, and (4) inoculation with bile. The first method has been accepted as the best for India on account of its simplicity and absolute safety, and consists in the injection of a suitable dose of serum calculated according to the body weight and susceptibility of the animal. The injection of this dose of serum does not give full protection for an unlimited length of time and is used with the object of raising the power of resistance of the animals which are exposed to infection, by neutralising the causal agent, so that if they are attacked during the period of immunity they get only a mild form of the disease and become after recovery totally immune for life. If, on the other hand, the temporarily immunised animals do not get a mild attack of rinderpest at the time of inoculation, they are as liable as ever to future attacks. In consequence it may be necessary to reinoculate, if the disease has not died out in the villages. The serum alone method should always be used with powers of compulsory inoculation and isolation. In order that its application in the field may be effective, all animals must be inoculated at the same time both in the affected village and in the villages in the neighbourhood, so that the site of the outbreak of the disease may be surrounded and isolated by a barrage of immunised animals, and, by the time the immunity conferred on them by the serum has disappeared, the disease will have also died out from lack of a suitable host.

This was the plan of campaign employed in South Africa, together with the simultaneous method, to stamp out the disease there. Power was placed in the hands of the controlling authority to inoculate and isolate all animals compulsorily, and the ignorance and prejudice of one owner was not allowed to endanger the stock of the neighbourhood. By these means South Africa was freed from a devastating scourge.

It has not yet been possible to control thoroughly the disease in India for the following reasons: inoculation is not compulsory in affected villages and in villages close by, movements of animals in affected areas are not restricted, and it is also difficult to enforce proper methods of disinfection.

The Superintendent, Civil Veterinary Department, Madras, writes as follows:—

"After an extended trial in this Presidency, it must be admitted that the 'serum alone' method of inoculation will not stamp out rinderpest in this country, while the conditions under which it has to be used in the villages remain as they are.

"Nothing less than compulsory inoculation will give the serum a fair chance, for, in a typical village, rarely as many as two-thirds of the cattle are produced for inoculation, and although the staff has been instructed repeatedly to return to every village for purposes of re-inoculating those animals which have already been done, the ryots get tired of producing them once a month, and when the animals eventually contract the disease from some of the uninoculated ones, and perhaps die, the serum is blamed.

"The result may be that eventually the ryots of that and other adjacent villages lose faith in the serum, refuse inoculation and re-inoculation altogether, and the disease goes on as if this department had made no effort at all in the matter."

It appears, therefore, that if legislation cannot be undertaken in the present conditions in this country, the question whether the simultaneous method cannot be adopted requires to be seriously considered, because there is not the least doubt that, with the increase in the facilities for transport of cattle by rail and road, the intection will be constantly on the move and will appear where least expected.

During the year under report Mr. Shilston and the Muktesar staff inoculated 1,498 animals at the various military dairy farms—Ayrshires, half-breds, country cattle and buffaloes—out of which only 8 died and these had rinderpest and foot-and-mouth disease at the same time. This indicates that, under proper supervision and with adequate staff, this method is of the greatest value, especially as the immunity afforded to the inoculated stock is of a permanent nature. It is true that it is not suitable for cattle over four months in calf and cows in milk, but, if sufficient staff is provided, it should be possible to considerably alter the present state of affairs for the better by beginning with the cattle on departmental farms, planters' estates, and with the herds of large Indian owners. Once this method is adopted in a particular tract and care is taken to inoculate the young

stock each year, there is no fear as regards future outbreaks in the tract, though an occasional sporadic case may occur in an imported animal. The department will then be able to concentrate its attention on other diseases like hæmorrhagic septicæmia, foot-and-mouth disease, anthrax, surra, etc. Methods of isolation and disinfection, should always be combined with methods of preventive inoculation as early as possible ; if not, sooner or later, they are liable to break down.

The bile method is not suitable for conditions in India.

The main thing to remember in dealing with attacks of rinderpest among dairy herds containing highly susceptible animals such as half-breds, is that the disease, after passage through a highly susceptible animal, such as a half-bred, attains a much higher virulence, and the doses of serum for the rest of the herd should be increased accordingly.

There is much scope for prefentive inoculation against hæmorrhagic septicæmia. Owing to its shorter course and usually greater virulence ryots are better able to appreciate the value of a protective serum in this case than in the case of rinderpest.

In connection with surra also the necessity for legislation is pointed out by Mr. Oliver, Superintendent, Civil Veterinary Department, United Provinces, in the following passage :—

" The spread of surra from its endemic areas in the tracts along the foot of the hills to the districts of Etawah, Mainpuri, Banda and Nainital, was due to the unusually extensive transport operations and frequent movements of animals during the past two years. In addition to these causes we must consider the yearly increasing facilities for travel and development of commercial intercourse between distant parts of the country, and it is easy to foresee a still further spread of infection unless energetic prophylactic measures are introduced without further loss of time. Whatever line of action is contemplated it is all important that the preventive measures taken must be swift and thorough. I am strongly of opinion that if we are to avert such a catastrophe as that which occurred in Mauritius in 1902–03, more effective legislation than at present exists should be introduced at once. In 1910, it was decided that, with certain modifications and at the discretion of Local Administrations, the Glanders and Farcy Act could be applied in cases of surra, but although this was introduced in the case of the United Provinces, in some of the adjacent territories and provinces no active steps in this direction were taken. It is obvious that compulsory slaughter of all diseased animals, and isolation of suspected cases and ' in contacts ' is one of the first and most important measures to be adopted, but if this rule is only enforced here and there the result cannot be anything but a costly failure. The Surra Act

or a modified or amended form of it should be applied without exception throughout the whole of India. Next in importance to the destruction of all affected cases is the more complete control of the movements of all animals in the diseased localities, and powers should be acquired to declare affected areas, and, where necessary, to prohibit ingress and egress to and from such places. Rules for the closing of fairs and the prohibition of animal traffic on certain highways, if desirable, might be considered."

In this as in many other diseases the increase in the spread of infection has become very marked, and it is most important that similar methods of control should be adopted throughout all India. A policy of control confined to a district or a province is a policy of half measures at which the disease will laugh.

Veterinary Education.

For the training of students there are Veterinary Colleges at Bombay, Madras, Calcutta and Lahore, and Veterinary Schools at Insein and Taunnggyi in Burma. The standard up to which the Bombay, Bengal and Madras colleges teach is more or less uniform. In these three colleges tuition is conducted through the medium of English, while in the rest it is in the vernacular. A glance at Appendix V. will show the main results of the working of the different colleges and schools during the year under report.

In many of the colleges farriers and dressers were also trained for service with the Army. The Principal of the Madras College also held a class for veterinary compounders which was attended by seven men. At the Insein School two Veterinary Assistants were under training for appointment as Veterinary Inspectors and one Veterinary Inspector for appointment as Deputy Superintendent. In accordance with the suggestion of Colonel Evans to send Assistants of the Southern Shan States in turn to Insein for practical training, six Veterinary Assistants were deputed by the Superintendent and Political Officer of these States.

There is a great demand for Veterinary Assistants in the various Provincial Departments, the Army and Indian States. The existing colleges with the present limited staff and accommodation are unable to fully meet this demand. The increased pay and improved prospects now available in the Army Remount and the Army Transport Departments, and the sanctioning of a Subordinate Indian Veterinary Department for the Army, will still further increase the demand for graduates, and the pressure especially on the Punjab College, already great, will still further increase. One more college at least is urgently needed in Northern India, located either at Lucknow or Allahabad,

to provide for the wants of the Hindi-speaking population. Complaints are numerous that the quality of the recruits is unsatisfactory, and it is agreed that, unless the prospects of pay and promotion are improved, it cannot be expected that men with higher educational qualifications will be forthcoming. All these matters, together with the question whether it is advisable to have a special higher grade college or possible to raise the standard at one or more selected colleges so as to turn out students who will be qualified for appointment to the higher grades of the Provincial Service or ultimately to the Imperial Service (as recommended by the Public Services Commission in paragraph 7, annexure II, page 79 of volume 1 of their report), are under the consideration of the Government of India. It is clear that, if the status of the Veterinary Department is to be improved, the question of veterinary education must be seriously considered, especially if it is proposed to provide a training which will qualify Indians for admission to the Indian Civil Veterinary Department.

Veterinary Research.

The amount of research work done during the year was not large, owing to the paucity of staff and increase in routine and administrative duties of those who were left to carry on.

Rinderpest.—The question of the vitality of the virus of rinderpest, under varying conditions is still under investigation at Muktesar, and a special series of experiments is being carried out with the object of ascertaining the length of time for which hides removed from animals which have died of rinderpest remain infective.

Dourine.—The diagnosis of dourine (the disease which has been giving so much trouble in the horse-breeding districts in the Punjab and Baluchistan) by the complement fixation test was continued, and there is every hope that it will be possible by this means to detect latent cases of the disease and so prevent its spread, as such animals though showing no visible symptoms may transmit the infection to healthy stock.

Anthrax and Hæmorrhagic Septicæmia.—The modifications in the manufacture of these sera foreshadowed in last year's report of the Imperial Bacteriologist, Muktesar, have been effected, and have resulted in a very distinct reduction in the mortality among the serum-making animals, and also in a saving of labour. The question as to the length of time hides from animals which have died of hæmorrhagic septicæmia remain infective is also under investigation.

In the Central Provinces, sufficient evidence has been obtained to implicate pigs as transmitters of hæmorrhagic septicæmia among cattle.

Contagious Abortion in Cattle.—A number of attempts were made at Muktesar to isolate the organism responsible for this disease from pathological materials sent to the laboratory, but all failed owing to the presence of numerous contaminating organisms. A culture of the bacillus responsible for the disease in Europe was obtained through the courtesy of Sir John McFadyean of the Royal Veterinary College. This strain is now kept running in the laboratory.

Up to the present the number of tests carried out is too small to warrant any definite opinion, but the results of these tests appear to indicate that the same bacillus is responsible for the disease in India.

Johnes' Disease.—In view of the detection of cases of this disease in India, a short account has been published in the *Agricultural Journal of India*, vol. XIII, part I. Two suspected animals were under observation at Muktesar, but attempts to obtain cultures of the bacillus were unsuccessful. In two cases positive diagnosis has been arrived at. The materials in question were portions of the intestines and mesenteric glands from two animals at Poona, and they were sent for confirmatory examination by the Superintendent, Civil Veterinary Department, Bombay. As the specimens had been placed in preserving fluid, nothing beyond microscopic examination was possible.

Tuberculosis.—A number of strains of tubercle bacilli have been isolated from bovine lesions and these are being studied at Muktesar.

Colonel Liston and Mr. Soparkar have carried on investigations into the susceptibility of Indian milch cattle to tuberculosis. Their experiments show that the comparative infrequency of tuberculosis among Indian cattle, whether buffaloes or bovines, is due to a natural resistance to infection rather than to differences in methods of housing, etc. It has also been found that individual susceptibility varies more among Indian than among English cattle. The results have been published in the *Indian Journal of Medical Research*, vol. V, no. 1, July, 1917.

In the January, 1918, issue of the same Journal, Mr. George Taylor gives the results of his enquiry into the prevalence of bovine tuberculosis in the Punjab. His figures would appear to indicate that, at least as far as concerns the Punjab, tuberculosis is not as rare a disease among Indian cattle as has been thought. It is pointed out that up to the present all the cases of bovine tuberculosis in Indian cattle have been recorded in northern provinces. On the other hand, the absence of or the limited nature of inspection in other parts may explain to some extent the absence of records of the disease.

Surra.—At the laboratory attached to the Punjab Veterinary College, the experimental treatment of surra with large doses of arsenious acid and tartar emetic has proved moderately successful, but the treatment is difficult and unwieldy and cannot be recommended

for adoption in the districts. Unfortunately some cases improve considerably and keep good condition although still bearing the trypanosome in the blood. If care is not exercised such animals may prove a danger to others when flies are prevalent. Some experiments have been made by Mr. Taylor regarding the transmission of surra in the dog, and the results so far obtained go to prove that the disease is transmitted from the jackal to the dog by means of infected fleas, and that the fleas from an infected dog readily spread the disease to other dogs kept near it. No case of distant transmission by the dog flea has so far been noted, but experiments are being continued in this direction.

Some mortality from surra in cattle was again recorded in the Central Provinces. In two instances in bovines the parasite appeared to be of a new species, judging from its morphological characters alone. But for want of experiment it is not possible to record any definite data bearing on this matter.

Miscellaneous.—Colonel Liston detected schistosomiasis in cattle, sheep and goats at the Bandra Slaughter House. It is probable that the disease is widely prevalent and enquiries are being instituted. The Provincial Veterinary Department and the Bacteriological Laboratory at Parel are collaborating.

Foot-rot among sheep was discovered for the first time this year in the Central Provinces.

Colonel Pease reports that the anti-rabic inoculation of dogs and horses has, so far as can be ascertained, proved successful, but decisive results have not yet been obtained.

(From " Report on Progress of Agriculture in India for 1917–1918 ").

CONTAGIOUS ABORTION QUESTIONS ANSWERED.

By Dr. F. B. HADDEY.

(*Continued from page* 36.)

What is the so-called " serum treatment " for abortion ? The term " serum " is used very loosely by both veterinarians and farmers. By some is meant any fluid or fake remedy used for the control of abortion. Others restrict the use of the term to biologic products of different kinds. It is properly applied only to an anti-abortion serum that contains specific antibodies against abortion bacilli. Such a serum confers a passive immunity lasting only one or two months, so is not employed to any extent.

Are carbolic acid, methylene blue, and other chemical agents useful ? Repeated trials of carbolic acid given by the mouth and injected under the skin have failed to support the claims made for it as a preventive or curative remedy. Nothing favourable can be said of methylene blue, which has so little germicidal action on the abortion

germs that when they were immersed in a 1 :4000 solution for three days they still retained vitality. Practically all veterinarians with experience regard most proprietary preparations advertised for the prevention and cure of abortion as useless or worse than useless.

Can sterility be treated successfully? Many cases respond surprisingly well to proper treatment. However, if no more than 50 per cent. of those that are treated eventually become breeders, the expense is fully justified in the case of cows whose progeny have especial value. It is not profitable to expend much time and money on the ordinary grade cow or even the purebred cow that has failed to make more than an average record.

How can one determine whether a given cow would be likely to respond to treatment for sterility? A careful, intelligent examination of the internal genital organs by a competent veterinarian should reveal the exact nature of the diseased condition. Then, and then only, is he in a position to state whether it would be advisable to attempt a course of treatment; or whether it would be best to send the animal to the butcher as incurable. Not only is the knowledge possessed by a veterinarian needed in a case of this kind, but also the proper instruments and skill in their manipulation. Moreover, even if it seems probable that treatment would be successful, the owner must determine whether the cow is valuable enough to warrant the cost.

When an accumulation of pus in the womb is found to be the cause of sterility, what can be done? The abnormal contents are removed by means of a special tube or catheter. Then about two gallons of a one per cent. Lugol's solution are introduced to cleanse the womb. After 10 to 15 minutes this fluid is drawn off and the womb is irriga ted with the warm salt solution. By massaging the womb through the walls of the rectum the fluid that has a tendency to collect on account of uterine inertia can be removed. It is best to repeat this treatment several days in succession.

How is standard Lugol's solution prepared? Five grams of iodine crystals and ten grams of potassium iodide are dissolved in 100 grams of water. This makes a transparent liquid of a deep brown colour, having an odour of iodine. It should be kept in a glass-stoppered bottle, protected from light, for making up the diluted solution advised above for uterine douching. The latter is prepared by mixing one part of the standard Lugol's solution with 400 parts of boiled water. Lugol's solution may be purchased from any druggist, if it is not convenient to prepare it at home.

What if cysts in the ovaries are determined to be the cause of sterility? In such a case the ovarian cysts should be ruptured by

manipulation through the rectal walls. This is not an easy operation to perform, but an experienced veterinarian can accomplish it. When successful, it restores the functions of the cow's ovaries and results in her becoming a breeder.

If the sterile cow is pronounced incurable, or is of little value, what then ? She should be sold at the first opportunity to the butcher. Under no circumstances should she be given service by the herd bull, as he might be a means of transferring the germs that were responsible for the trouble to other cows subsequently served.

Development of Immunity.

What is meant by the term " immunity " ? The term "immunity," as it is commonly used, conveys the idea of protection against certain diseases of microbial origin. Immunity may be the result of a natural attack of disease or of purposely infecting the animal with the living, disease-producing germs. The immune animal may or may not harbour the germs in its body, but when the germs are present they are unable to produce damage.

What is understood by immunity to abortion ? If a cow is immune to abortion she has the ability to resist the abortion germs. In the case of abortion immunity the protection is sufficient to prevent the most characteristic symptoms of the disease, viz., abortion of the fœtus, retention of the placenta, and sterility. This does not necessarily mean that no abortion germs exist in her body, or that she is incapable of transmitting them to other animals. It implies the presence of large amounts of protective substances (antibodies) which destroy or check the growth of the abortion germs.

How can it be shown that cows may become immune ? It is a matter of common observation that cows do not continue to abort year after year, but eventually recover from the infection and bear healthy calves. About 80 per cent. abort once, 15 per cent. twice, and 4 per cent. three times. Presumably the percentages for the latter two groups would be higher were it not for the fact that many owners dispose of aborting cows without giving them a chance to conceive again. However, this would tend to prove that protection against subsequent abortions in a certain proportion of cows is afforded by one infection that was sufficiently active to produce abortion.

Why do some herds possess more resistance than others ? With the abortion disease, as with all other infectious diseases, there is naturally a marked difference in the resistive ability to disease in different herds. The reasons for this are not always clear. In some cases it seems to be due to an inherent or natural protection, the origin of which cannot be determined. In other cases it may be the care

given the cattle and the means used to combat the disease. Again, the resistance may be more apparent than real, as would be the case if the herd contained a relatively large proportion of heifers, which are more liable to abort than are mature cows.

Why do all the cows in one herd suddenly stop aborting, while in another herd the cows continue to abort year after year ? In the first herd it would be due to an infection with abortion germs of relatively low virulence, or to a resistance on the part of the cows somewhat higher than that possessed by the general run of cattle. In the second herd just the opposite conditions would exist. This explanation seems both logical and in accord with well-known facts concerning other germ diseases.

If a heifer aborts once, is she likely to abort in the next gestation period ? If a heifer aborts her first calf there is a greater probability that she will abort during the second gestation period than a mature cow. This statement is based on carefully kept herd records. For example, of 25 heifers which aborted their first calves, 14 (56 per cent.) aborted in the next season. Some heifers derive enough immunity to tide them over one or two gestation periods, but abort again in a future period.

Why do not all cows after aborting once become immune ? Possibly because some of them did not get a large enough dose of the infective material to render them sufficiently resistant. In other cases it may be that the body had not time in which to produce immunity, or that some animals are not so immunisable as others.

What methods of immunisation are available ? There are two methods employed for conferring immunity against abortion. They are : (1) the injection of live abortion germs ; (2) the injection of dead abortion germs. A preparation of the former is properly termed a " vaccine"; of the latter a " bacterin."

Why is the use of live germs urged by careful investigators ? Because it is requisite, for the successful vaccination of animals against abortion, to produce a mild attack of the disease. This results in the production in the body of certain defensive substances, known as antibodies, which are capable of preventing any abortion germs that may subsequently gain entrance from producing the disease in the natural way.

By whom and on what grounds is the use of the dead germs urged ? Many commercial firms engaged in the manufacture and sale of biologic products have flooded the market with " abortion bacterins." They have been the leaders in advising veterinarians and farmers to employ these products, some having gone so far as to guarantee certain results

What results have been obtained in herds treated with both the live and the dead bacilli? Veterinary investigators for the Board of Agriculture of England have given these methods a thorough trial in herds where severe losses had occurred. A summary of their results follows:

What do the results in the foregoing table indicate? They show (1) that immunisation with live abortion bacilli (vaccination) resulted in conferring immunity on 93·5 per cent. of the cattle treated in herds where over 30 per cent. of them aborted before the experiments began; (2) that over 23 per cent. of the untreated controls aborted; (3) that treatment with the dead bacilli conferred little if any immunity, for the percentage of abortions in this group was practically the same as in the group left as controls; (4) that although the treatment with "abortion bacterins" causes little or no harm, it does not seem materially to influence the disease; (5) that the use of the live bacilli has great promise.

What are the disadvantages of employing the live bacilli? The disadvantages are: (1) rapid deterioration of the vaccine; (2) slow development of immunity; (3) temporary discomfort to the animal; (4) danger of introducing the infection.

How should abortion vaccine be administered? The method that has proved most satisfactory is the hypodermic or subcutaneous injection of the vaccine. Cattle at the Station vaccinated experimentally by injecting the vaccine into the blood aborted. The vaccine should be injected with a recently sterilised hypodermic syringe at any convenient place, preferably under the skin of the neck or just back of the shoulder. The skin over the point of injection should first be cleansed with a disinfectant.

What is the dose of this vaccine? A large dose gives the best results. At the Station 30 c.c. of a heavy suspension of the live abortion bacilli is injected. This is about equal to the amount of growth that develops on the surface of hard media 2 by 6 inches in area.

How long does the immunity produced by injecting live germs last? The length of time a cow is rendered immune varies with the individual animal. Experiments conducted at the Wisconsin Station prove that in cases treated with living germs the protection was effective for two years, throughout two gestation periods, and probably for a longer time. The English Commission state that it is necessary to continue the inoculations for a time on the infected animals after abortions cease to occur. Any animals brought from other herds should be inoculated at the first opportunity. In England very few of the animals that have been immunised for one pregnancy have aborted subsequently; there-

fore, it appears that if an animal is immunised for two pregnancies there is very little chance of her aborting afterwards. It is important for the dairyman to know that the use of live abortion bacilli (contagious abortion vaccine) does not cure or eliminate the germs from the treated animal, but simply puts it in condition more effectively to resist the attacks of the germs.

When is the proper time to vaccinate ? A vaccine is a preparation containing the living germs, and can be safely used only on unbred heifers and open cows at least two months before being bred. If animals are treated during pregnancy there is danger of causing abortion.

Is this method of treatment recommended for general use ? The results given above are highly encouraging. However, its general use is not advised until more evidence is gathered from cattle that have already been treated in Wisconsin. The University will gladly co-operate with reliable breeders who have valuable herds that they wish to immunise. Correspondence is invited with owners who are interested in this proposition. Letters should be addressed to the Department of Veterinary Science, College of Agriculture, Madison.

What effect does injecting the live or dead abortion germs have on the blood test for abortion ? Such injections cause the blood of the treated animals to react to the tests. In the case of most animals it has been found that the blood gradually loses its reacting property unless the injections are repeated from time to time. Blood tests on herds that have been treated with a vaccine or bacterin are helpful in determining the degree of immunity that the animal possesses.

What are the reasons for bulls showing a greater resistance against abortion than heifers and cows ? Bulls appear to have a sexual immunity that is accountable for their being less susceptible. This appears to be due to certain anatomic and physiologic differences in their sexual organs which make these less favourable places for the growth of the abortion germs than those of the opposite sex.

Preventive and Control Measures.

How can abortion be prevented from getting a foothold in a clean herd ? Eternal vigilance by the cattle owner to prevent the introduction of infection is the first essential to success in any attempt to keep a herd free from abortion. This implies the maintenance of a sanitary stable and provision for an adequate supply of suitable feed. In order to detect cases of abortion infection before the animals actually abort, the herd should be tested once or twice a year and all reacting animals removed at once. When it is desirable to purchase stock to build up the herd, preference should be given to calves under

ten months of age, as they are less apt to be infected at the time of purchase than are heifers or cows. All cows from the outside must be required to pass a blood test before being turned with the herd.

What can be done to control abortion after it breaks out in a herd? The following procedure is recommended in handling a herd of cattle in which abortion infection is known to exist: (1) daily douching with the salt solution of all cows that have a vaginal discharge; (2) provision for a food supply that is adequate as to nutritive and mineral content and free from contamination; (3) complete removal of retained afterbirths, with subsequent cleansing of the womb as previously described, to prevent an accumulation of pus which is likely to result in sterility; (4) disposal of aborted fœtuses and contaminated bedding by burning or deep burying, and disinfection of the gutters and floor; (5) isolation of all cows known to be infected with abortion; (6) when possible, treatment of all heifers and cows about two months before breeding with a vaccine composed of live abortion germs.

Are these plans successful? The Station has been able to prevent and control contagious abortion in both non-infected and infected herds when the appropriate plan was conscientiously followed. The owners praise the results obtained, and feel that at last satisfactory systems of managing purebred herds have been found. It should be understood, however, that although excellent results have been secured in a few herds, many more must be kept under the conditions specified before it is safe to conclude that these plans will be generally successful. Dairymen should familiarise themselves with the methods of procedure so that they can put one plan or the other into operation on short notice. It would be unreasonable even to hope that every abortion could be prevented, but there is assurance that the disease may be effectively controlled if the proper plan is followed.

What are the most important factors in the control of metritis, abortion, and sterility? Experience teaches that thorough cleansing of the genital tract after an afterbirth has been retained is the key of success in preventing and controlling these diseases of the cow's generative organs. For this purpose, a solution of common salt in water, prepared and introduced according to the directions given, is best, This solution is preferable to a disinfectant, which is certain to cause irritation and straining if it is made strong enough to kill germs. Another factor in controlling these diseases is to keep healthy cows from coming in contact with the discharges of infected cattle.

May the herd bull be allowed to serve cows from other herds? Not unless the herds are known to be free from the abortion disease, and are being maintained under the system recommended in this bulletin. Even then the bull's sheath should be flushed out before and

after each service with the weak Lugol's solution that has been recommended for the irrigation of cows.

What is the best method of irrigating the bull's sheath? A soft rubber tube attached to a funnel or regular hospital irrigator is greased with vaseline and gently pushed into the sheath. The hand is used to compress the sheath about the tube, so that every fold in the former may come in contact with the fluid. After a minute the hand is released to permit the fluid to escape; then the process is repeated. Lugol's solution of iodine diluted to make a 0·25 per cent solution and prepared according to the directions already given is one of the best antiseptics for this purpose.

Is it necessary to douche or irrigate the genital organs of healthy animals to prevent abortion? Douching of healthy cattle is not only unnecessary, but is also likely to be harmful if long continued. Furthermore, unless great care is used, there is danger of disseminating disease by the rubber tube or syringe. For these reasons it is not advisable to irrigate healthy cows, heifers, and bulls.

Is it advisable to change bulls to prevent further trouble from the abortion disease? Many farmers, thinking that the abortion disease is due to the herd bull, have disposed of him and bought another, only to find that the trouble continued or became more severe. From the facts presented elsewhere in this circular about the bull's part in abortion, it is clear that by getting another to head the herd the problem of controlling the abortion disease will not be solved.

Is it possible to eradicate the abortion disease by selling all cows that abort and buying others? This would depend on the extent of the disease in the home herd and the herd from which the new cattle were obtained. Ordinarily it is not good policy to sell cows that abort, as this depletes the herd too much. Furthermore, if the aborting cow is given the attention advised, she is a more valuable member of the herd than cows from other herds about which little or nothing is known. On the other hand, if only one cow aborts, it is good policy to dispose of her at once, before she has had an opportunity to infect other members of the herd.

What precautions should be taken before bringing cattle into a herd that is free from the abortion disease? All cattle that are to be placed in an abortion-free herd should be quarantined until after calving, and required to pass at least one blood test. Otherwise there is danger of introducing the disease.

Should every animal responding to the blood tests be sold? Reference should be made to the answers to questions under "Treatment of Affected Cattle." As a general proposition, if only a few animals

react, it would be feasible to dispose of them, but if 10 per cent. or more of the herd react it would not be good policy.

How long will it take to eradicate the abortion disease from a herd? While it may be impossible completely to eradicate the abortion disease from a herd in one year, or even two, there is no doubt that the disease can be controlled and the herd made profitable if the directions given herein are followed with intelligence and persistence.

Would it be safe to bring a calf from an infected into a clean herd? If the calf has been fed pasteurised milk for a period of three or four weeks prior to moving, or has been on a ration that does not include raw milk for a like period, there is little chance of its bringing the disease into a clean herd. Otherwise, it should be kept in quarantine at its new home for a month before being permitted to mingle with the other stock.

How may a stable be disinfected? All loose litter should be removed from the floor, mangers, and watering troughs. Then the entire inside of the stable, including the ceiling, should be swept and scrubbed to remove all encrusted material. Afterwards a reliable commercial coal tar disinfectant, prepared strictly according to the manufacturer's directions on the original package, is to be applied. Keep in mind the fact that sunlight and air are effective destroyers of germ life, and admit them to the stable at every opportunity. Whitewashing the interior of the stable is also helpful. A sprinkling of air-slaked lime over the floors and in the gutters helps to keep the stable sweet and aids in disinfecting it.

Is there a law against selling cattle infected with abortion? There is no law that prohibits the sale of abortion-infected cattle for slaughter. If such cattle are sold to go into other herds the seller should inform the buyer that abortion exists, else he may be held liable for damages resulting from abortion infection.

BIBLIOGRAPHY.

Hall, Maurice C. 1917. Anthelmintic treatment for nematode infestations in dogs. Jour. A. V. M. A., v. 5 (3), Dec., pp. 342-345.

The anthelmintic value of chenopodium components. *In* Hall and Hamilton, pp. 240-261.

Hall, Maurice C., and Winthrop D. Foster. 1918. Efficacy of some anthelmintics. Jour. Agric. Research, v. 12 (7), Feb., 18, pp. 397-447, 1 fig.

Hall, Maurice C., and Herbert C. Hamilton. 1918. Investigations on the composition of oil of chenopodium and the anthelmintic value of some of its components. Jour. Pharm. & Exp. Therap., v. 11 (3), Apr., pp. 231-261.

Meyer, K. F. 1911. The pathology of nephritic affections in domesticated animals. Proc. A. V. M.A., pt. 1, pp. 224-441.

Neveu-Lemaire, Maurice. 1912. Parasitologie des animaux domestiques. Paris. 1257 pp., 770 figs.

Railliet, A. 1915. L'emploi des médicaments dans le traitement des maladies causées par des nematodes. Rec. d. méd. vét., Paris, v. 91 (15), Aug., 15, pp. 490-513.

1917. L'oxyurose de Equidés. Rec. d. med. vet., Paris, v. 93 (19), Oct., 15, pp. 517-541.

Whipple, G. H., and J. A. Sperry. 1909. Chloroform poisoning. Liver necrosis and repair. Johns Hopkins Hosp. Bull. (222), v. 20, Sept., pp. 278-289.

Zeigler, W. H. 1917. A study of oil of chenopodium. Interstate M. Jour., v. 24 (10), 13 pp., fig. 5.

(Journal American V. M. Assoc., April, 1919.)

Translation.

ANÆSTHETICS IN VETERINARY SURGERY.

By HENDRICKX.

One distinguishes general anæsthesia and partial anæsthesia, which is divided into local and regional. Anæsthesia has a twofold aim: (1) Humanitarian : to suppress pain ; (2) utilitarian : suppression of the reactions of the animal and the arousing of muscular resolution.

The three chief agents used in veterinary practice are ether, chloroform and chloral. Studying the effects of ether and chloroform, which both have local and general anæsthetic properties, more accidents occur with the latter than the former, but the former takes longer to act and produces a more violent period of excitement.

Three phases of anæsthesia may be discussed—(1) excitement ; (2) operative anæsthesia ; (3) toxic anæsthesia.

Excitement occurs very rapidly in the horse and dog ; it is in direct proportion to the individual nervous irritability of the subject ; it is wise never to administer the anæsthetic to the horse in the standing position.

The second phase occurs at the end of a few minutes ; voluntary motility disappears, then sensibility to pain ; the general sensibility disappears at the eye last of all ; when the ocular reflex has disappeared anæsthesia is complete. All the functions of relative life are abolished ; respiration and circulation continue, but are modified. It is to the circulation that chloroform is dangerous ; it provokes a progressive paralysis of the vaso-motor centre, whereas ether excites it ; it diminishes arterial tension, whereas ether reinforces it.

If the administration of anæsthetics is continued, their action is transmitted to the vaso-motor and respiratory vaso-motor bulbar centres, respiratory and cardiac syncope are produced, and death occurs if a rapid intervention is not undertaken ; this is the toxic phase. One ought to consider as a very grave index the sudden dilation of the pupillary opening. Other accidents may arise ; primitive syncope may happen with the first anæsthetic vapours ; secondary syncope may be due to administration of a big supply of chloroform and also to diverse troubles : rhinitis, bronchitis, pneumonia, degeneration of the kidneys, heart and liver. To avoid and contend against these accidents Hendrickx draws up the following rules :—

1. Only anæsthetise patients free from organic lesions of the heart.
2. Only operate on subjects after fasting.
3. Only use agents chemically pure.
4. Avoid all hindrances to free movement of the respiratory organs.
5. Never administer massive doses at the start.
6. In small animals utilise the mixed method, injecting beforehand a solution of sulphate of atropine and hydrochlorate of morphia.
7. Watch the ocular reflex and pulse.
8. Stop the anæsthetic on the slightest warning.

To guard against respiratory syncope one must practise artificial respiration and make rhythmic tractions of the tongue. It is hardly possible in veterinary medicine to guard against cardiac syncope, for the only effective means is electrisation of the anterior region of the spine.

For cattle alcohol is the best narcotic ; never use chloroform for the sheep and goat ; ether is the best anæsthetic for the cat. To avoid or diminish the drawbacks of these two agents one has recourse to the use of subcutaneous narcotic injections as aids to the anæsthetic. Different solutions are used. The author recommends scopolamine in the dose of one centigramme for the horse and the following solution : sulphate of atropine, 5 milligrammes ; morphine hydrochlorate, 10 centigrammes ; water, 10 grammes for a dog of medium size.

Chloral hydrate does not produce complete anæsthesia, but considerably lessens sensibility and produces sufficient muscular resolution in most cases. It may be used as an intravenous injection or rectally or intra-peritoneally. Rectal injection is the procedure for choice. Hendrickx uses 80 to 100 drachms of chloral in a litre of water. Make the injection under feeble pressure at a temperature of 38° C, 10 to 15 minutes before commencing operation.

The author recommends the use of sulfonal in a dose of 60 to 80 grammes some 10 hours before operating.

On account of the dangers of general anæsthesia, local anæsthesia is often preferable, which, whilst preserving the chief functions, removes sensibility at the place of operation. A typical local agent is cocaine. Its general action is excitant; locally it acts on the substance of the sensitive nerve filaments and abolishes sensibililty. Its effect is fleeting and its action insufficient for a big operation; to render it more complete and durable, Messrs. Dupius and Vanden Eeckhout recommend that it be combined with a few drops of the standard solution of adrenalin. The formula which gives the best results is as follows:—

Cocaine, 30 centigrammes; solution of adrenalin hydrochlorate at 1 per cent., 5 drops; distilled water; 10 grammes.

This solution is used by painting on a mucosa or on a wound, by instillation into the eye, by subcutaneous or intra muscular injection.

In the dog it is preferable to use stovaine, as it is less toxic than cocaine and can be used in the same doses. Novocaine can be used equally as well.

Solutions of cocaine ought only to be used when freshly prepared.

Finally, when one wishes to anæsthetise an extensive region, one has recourse to regional anæsthesia, which is effected in three ways: (1) by injection of the solution over the tract of a sensitive nerve; (2) by the injection of this same solution at the level of the exit of the nerve from the spinal column; (3) by injection of the solution into the sub-arachnoidean cavity.

The first method is used in veterinary medicine to diagnose the precise seat of a lameness; one injects 5 c.c. of the solution indicated previously.

The two other procedures are little practised in the large animals, and can perhaps only be recommended for the dog and cat.—*Annales de Méd. Vét.* G. M.

PYELONEPHRITIS IN CATTLE.

By W. L. BOYD,
University Farm, St. Paul, Minn.

During the past two years we have had the opportunity of studying two different cases of pyelonephritis. One of the animals was under our direct care, so that we were able to make daily observations and note the various symptoms. This case assumed rather an acute form, dying approximately three weeks from the time the first signs of illness were noticed.

The autopsy revealed the presence of extensive pathologic changes in both kidneys, ureters, and bladder. In the second case we were called out of town for consultation, arriving in time to conduct the

post-mortem examination. The pathological changes in the kidneys, ureters, and bladder of this animal were almost identical with those of animal Number One.

Symptomatology.—Case Number One was a Guernsey cow, three years of age. Shortly after an apparently normal calving she suffered a mild attack of mastitis. After recovery there was a marked decrease in the flow of milk which we were unable to account for, as the udder was soft, pliable, and free of any structural change as far as we could detect by palpation. The appetite shortly after was noticed to be diminished and rather capricious. The urine, which appeared normal, was voided without difficulty, as were the fæces, which appeared normal. No diagnosis was offered, but the animal was given stomachics and tonics. A few days later the animal showed colicky pains, which were manifested by kicking at the belly and uneasiness. The pains were of short duration, and did not recur, as far as we were able to determine.

The patient's desire for food became less, rumination ceased, and she drank less water than usual. Diarrhœa developed, and copious amounts of foul-smelling fæces were passed. The urine was now noticed to be cloudy and streaked with blood. A rectal examination led to the discovery of enlarged ureters, and pain was evidenced upon palpation of the kidneys. A provisional diagnosis of nephritis was then made, and mild diuretics and stimulants were administered. Emaciation rapidly occurred, and the animal gradually grew weaker, until she finally went down and was unable to again regain her feet. Soon afterwards she was found in a moribund condition, at which time she was destroyed and autopsied.

The post-mortem findings consisted of enlargement of both kidneys. The renal capsule was slightly thickened and adherent to the cortex, numerous abscesses of various sizes were found in the cortical region, some of which broke and discharged a greenish yellow pus when the capsule was removed. The cortex also contained numerous petechiae. Many of the renal papillæ were entirely disintegrated, which had resulted in cavities with purulent material. The distended pelvis was filled with a yellowish brown fluid which contained blood clots, tissue threads, and some calcareous material. The left kidney was surrounded by a mass of coagulated blood which was partially organised. The ureters were enlarged to the size of a man's middle finger, and were filled with a mass of coagulated blood and tissue débris. The mucosa of the bladder was studded with punctiform hæmorrhages, and the walls were somewhat thickened.

In Case Number Two the history showed that this cow, approximately one year previously, had suffered with a severe form of mastitis

following calving. There was abscess formation of two quarters, and in one quarter sloughing resulted, which involved a part of the parenchyma of the gland as well as the skin. This animal was a large Holstein cow which at the time of death was about eight or eight and one-half months in gestation. The first symptoms of illness consisted of partial loss of appetite, suppression of rumination, and unthriftiness followed by emaciation, and a few weeks before death colicky pains were observed. The urine was noticed to be cloudy and thick, and to contain blood at only one time. Diarrhœa was not seen. Emaciation was marked, but not extreme, at time of death, which took place rather unexpectedly. Autopsy findings tallied very closely with the lesions described in Case Number One. Both kidneys, the ureters, and bladder were involved. Histo-pathological examinations showed the presence of purulent centres with cellular infiltration. Stained sections of the cortex revealed the presence of numerous club-shaped bacteria which we failed to cultivate. As to the origin of the infection in these cases the writer is in doubt. It seems probable, however, inasmuch as both cows had suffered previously with mastitis, one of which was purulent in type, that the infection was of a hæmatogenic origin.—*Cornell Veterinarian.*

PYÆMIA.

By C. P. FITCH, W. L. BOYD and H. C. H. KERNKAMP,
University Farm, St. Paul, Minn.

THE patient was a registered Holstein cow, a world's champion animal. She was first seen by us on November 25. The herdsman gave us the following history :—

The cow had calved in June and cleaned normally. Calf, however, died soon after birth. Previous to calving the cow had been lame in the right hind leg. Examination showed a "corn." This was treated with tincture of iodine. Following calving she grew very lame, and finally went down and could be raised only with great difficulty. Temperature, taken daily, was normal. The animal had been turned over from time to time and bedded carefully, but many decubital sores had developed. Bowels were normal. The treatment had been stimulants and stomachics.

Physical examination at the time of our visit showed a very much emaciated animal which had decubital sores on nearly every bony prominence. Most of these had ruptured and seemed to be healing. One at the point of the olecranon on the left side seemed filled with pus. Attempts to get the animal on her feet failed, as she could not support her weight behind. Pulse respiration and temperature were

normal. Percussion and auscultation of the thoracic cavity showed nothing abnormal. The abdominal organs, as far as could be determined, seemed to be O.K. The foot previously affected with a "corn" also showed nothing. The decubital sores were all sensitive. No large external swellings were detected. Atrophy of various groups of muscles was noted, especially of the gluteal, membranosus and tendinosus.

A provisional diagnosis of decubitus and paralysis, possibly obturator, was made. The owner was advised to treat the decubital sores with an antiseptic and a styptic dusting powder. Iron, arsenic and strychnine (1 per cent.) was advised as a stimulant. It was further suggested that electricity be tried over the affected regions of the posterior part of the body. It was deemed advisable to sling the animal, if possible.

We learned nothing more of the case until December 29, when we were notified that she was dead, and an autopsy was desired. That day we were out of town, and did not return until the 30th, on the afternoon of which we made a careful autopsy. The following notes were taken :—

Cadaver lying on its right side. All bony prominences on the left side were quite extensively involved with decubitus, particularly over the orbit, at the angle of the jaw, at the wing of the atlas, over the olecranon, over the external tuberosity at the distal end of the radius, over the fetlock joint in the front limb, at the external angle of the ilium and the tuberischii, over the coxo-femoral articulation, over the point of the hock (tuber calcis, apex of the calcaneum), and at the fetlock joint of the hind limb. The same condition prevailed on the right side, and, in addition, the lesions over the coxofemoral articulation were more extensive. The thoracic organs appeared normal. The digestive tract, liver and spleen showed no visible changes that could be attributed to post-mortem decomposition. The cortex of the kidneys showed small (2 mm.) areas which were whitish in colour, apparently areas of parenchymatous degeneration. The sublumbar lymph gland on the right side was enlarged about eight times (8 cm. in length) and very hyperæmic. The left sublumbar was also enlarged about four times and hyperæmic. The supramammary lymph glands were enlarged and markedly congested. The left utero-ovarian artery was very much enlarged. An aneurism of this blood-vessel was found just before its ramification into the uterus. The left ovary was very small and contained a small corpus luteum. The right ovary appeared normal. The mucous membrane of the uterus was markedly hyperæmic throughout, possibly the left horn was more affected than the right. A very small amount of pus was found in the uterus. There was a

slight catarrhal inflammation of the udder. At the humero-radial joint on the right side there was an abscess 10 cm. in diameter which involved the articular cartilages slightly. Also at the meta-carpo-phalangeal articulation a small abscess was located. An incision made into the coxo-femoral articulation on the right side showed a very large deep abscess and a fistulous tract. The abscess was situated just beneath the *tensor fascia-lata* and *gluteus* muscles and upon the *rectus femoris* muscle. This abscess was 20 cm. long and 10 cm. wide. From the interior or ventral border of the cavity was a fistulous tract leading down to the stifle joint. It did not, however, come to the surface, but remained beneath the muscular layer. The articular surfaces at the distal end of the femur were eroded. The spinal cord appeared œdematous, especially in the lumbar region, and in the sacral region it was very soft and degenerated. These latter changes may have been post-mortem.

Discussion.—This is a very interesting case, showing how easily the primary cause of a condition may be overlooked. There was absolutely nothing to indicate a deep abscess over the coxo-femoral joint except, of course, the skin decubitus. As a matter of fact, at the autopsy, after the skin and decubital portion had been removed, there was nothing (no swelling) to indicate the presence of the abscess. It was found only when an incision was made in order to examine the articulation. It is quite probable that this abscess started from an infection that began in the foot (the " corn "). If this abscess could have been located and drained, in all probability the animal would have recovered. When we saw her she was sensitive over all the bony prominences, not any more so over the right coxo-femoral joint, and absolutely no swelling or heat was noted in this region except that which was accounted for by the decubitus.—*Cornell Veterinarian.*

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: " Baillière-Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

Annual Subscription for the British Empire, 18s., post free; for the United States, $4.50; or combined subscription with the " Veterinary News" (weekly), 30s., post free.